Light and Lighting

Vol. XLVII.—No. 9
September, 1954

Published by The Illuminating Engineering Publishing Co., Ltd., on the 1st of each month, at 32, Victoria Street, London, S.W.1. ABBey 7553. Subscription rate 25s. per annum.

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The Artificial Lighting Season

IT would be almost facetious to remark that summer is now drawing to its close for, up to the time of writing, there has been next to nothing of what we usually call summer. Nevertheless, if the name of the season to which we refer has been discredited, the calendar period involved *is* nearing its end, and this means curtailment of daylight and the approach of the seemingly lengthening annual period in which man-made light must heavily be relied upon to do duty for Nature in the matter of letting us see and cheering our spirits. If we may be pardoned for an atrocious parody, let us say that in the " fall " the illuminating engineer's fancy lightly turns to thoughts of (his professional) love. He will have planned already new installations which are to make their début at the beginning of the " artificial lighting season," and he will be looking forward to satisfactory reports on these new installations after they have come into regular service. But, also, he knows that the deficiencies of old installations will become apparent to more users as shortening days compel more and more reliance upon artificial lighting, and so the demand for new and better lighting will make its seasonal advance.

Notes and News

Dow Prize Competition

It is but ten weeks to the closing date (November 15) of the 1954 Dow Prize Competition. Ten weeks is a very short time and those intending to enter and carry off the £75 prize had better do something about it without delay. We have no idea how many entries there will be but we gather that there is likely to be a number from overseas.

There are times when we get rather depressed about the young men in the lighting industry; sometimes it seems that there are none or that the few there are are not exactly full of enthusiasm. We are told that attempts to arrange an evening of students' papers in London similar to that held a year or so ago met with no response. Is it that the younger people are too shy or is it that they are not getting the right encouragement from their elders? Maybe it is that the right types are not being attracted into the industry—little pay and few prospects. (We have a feeling that we have said all this before so perhaps we had better get back to the Dow Prize.)

We hope this reminder of the competition will spur some lighting students to have an attempt. Architectural students are never afraid of competitions; they are part of their training. We must see that students of lighting view competitions in the same way. And when we say "we" we mean all you people who employ or supervise lighting engineers.

Miners' Lamp Bulb Testing Station

The National Coal Board have set up a testing station at Treorchy, South Wales, to check the quality of bulbs supplied to them for use in miners' lamps throughout the coalfields. These bulbs, an essential factor in the production of coal, are relatively expensive when it is realised that the Board buy some 2,500,000 a year at a cost of about £200,000. A form of quality control has, therefore, been introduced with a view to maintaining a high standard of lighting, essential for production and the health of the miner.

The decision to institute such control was taken on the recommendation of the Board's divisional electrical engineers' conference. The South-Western Divisional Board agreed to set up the new station, which has now been in operation for some months testing samples of bulbs on a national basis.

The objects of the station are to accumulate basic information about all types of miners' lamp bulbs produced by the several manufacturers, to establish routine testing, and to seek the co-operation of suppliers in achieving and maintaining a consistent quality. The testing of new types of bulbs is also undertaken before production quantities are made. The large proportion of miners' lamp bulbs are manufactured to B.S. 535 : 1953, and all testing procedure at the station conforms strictly to this specification.

The specified tests fall into three main categories (a) physical, (b) photometric, and (c) life. In the physical tests bulbs are examined for overall size, for mechanical strength in a torsion testing machine, and for light centre length. In the main conventional apparatus is employed, but the station uses a projection apparatus for measuring light centre length in which a magnified image of the bulb under test is thrown on a calibrated screen. This is an important test because the light distribution from the reflector of the miners' cap lamp is dependent upon the light centre length of the bulb.

The photometric apparatus was designed to meet the special requirements of the station with regard to accuracy, speed, and ease of operation. A method of substitution photometry is employed and standard bulbs calibrated by the National Physical Laboratory at Teddington are used for setting up and checking the equipment. The photometric apparatus accommodates ten similar bulbs at one time, placed at regular intervals on the perimeter of a turntable rotated by an electric motor operated by means of a foot switch. Each bulb is brought round in turn, is raised by push-button control to the centre of a sphere, the appropriate voltage is applied and the current and light output measurements are made.

The life-testing equipment was designed by the Board's engineers and scientists and was assembled in their own workshops. The racks are of novel design and considerable precautions have been taken to provide a voltage constant within limits which are even narrower than those specified by the standard. In the life tests bulbs are measured for their current consumption and light output at their rated voltage, first at 40 per cent. and later at 60 per cent. of their specified life. The life of a bulb as used in the pits should, it is considered, be from two and a half to three times its life under laboratory test conditions for the reason that using battery supply, the bulbs are under-run for quite a large part of every working shift.

International Commission on Illumination

The next meeting of the International Commission on Illumination (C.I.E.) is to be held in Zurich from Monday, June 13, to Wednesday, June 22, next year.

The meetings will take place at the Congress House, a new building designed to accommodate large conferences.

The full programme is unlikely to be available until early next year, but there is no doubt that the ten days in Zurich will be very busy ones. The list of subjects to be discussed is a long one as shown below; the countries mentioned after each subject are those responsible for preparing the secretariat reports.

Basic quantities	France
Vocabulary	Switzerland
Photometry	France
Colorimetry	U.S.A.
Colour rendering	Germany
Colours of light signals	U.S.A.
Photopic and scotopic vision	France
Glare and adaptation	Italy
Sources of visible radiation	Gt. Britain
Sources of u.v. and i.r. radiation	Germany
Operating accessories	U.S.A.
Reflecting, refracting and diffusing materials	
Predetermination of illumination and luminance	U.S.A.
Estimation of comfort in lighting	Australia
Home lighting and hotel lighting	Germany
School and office lighting	Sweden
Industrial lighting	Gt. Britain
Lighting of public buildings	France
Hospital lighting	Finland
Lighting for selling	France
Lighting for indoor games	Sweden
Mine lighting	Belgium
Theatre stage lighting	Gt. Britain
Lighting for photography, cinema and television production	U.S.A.
Lighting in hazardous and corrosive situations	Gt. Britain
Decorative lighting	Spain
Daylight	Australia
Street lighting	Gt. Britain
Aviation ground lighting	Netherlands
Railway and dock lighting	
Airborne lighting and signals	U.S.A.
Lighting for outdoor games	Brazil
Automobile headlights	Netherlands
Floodlighting	Italy
Signal lights	France
Education in schools	Switzerland
Popular education	U.S.A.
Lighting legislation	Israel

For those not familiar with the set-up of the C.I.E. a brief note may be useful. Each of the member countries has a national committee on illumination which in turn sets up sub-committees to study the various subjects given in the above list. (The list, incidentally, is not hard and fast; new subjects are added or old ones dropped as need or interest demands.) These sub-committees send reports to the secretariat country which then prepares a report on the subject taking into account all the information supplied by different countries. These reports are circulated before the meeting of the C.I.E. and are discussed at the meeting. The reports, resulting as they do from experience gained in many countries, contain very valuable information which in presentation is supplemented by illustrations of installations and equipment. It will be seen from the list that a great number of practical subjects are covered by the C.I.E.

In addition to these reports papers relating to the different subjects are also presented and discussed.

The official languages at these meetings are English, French and German, but those who make no claim to being linguists need not worry as most of the discussions take place in English.

As soon as details of the Zurich meeting are available we will make them known. In the meantime those who are not already connected with the N.I.C. and who are interested in attending the meeting should get in touch with the National Illumination Committee of their country; in the case of Great Britain this would be Mr. L. H. McDermott, Hon. Secretary, National Illumination Committee of Great Britain, The National Physical Laboratory, Teddington, Middx.

B.S.I. Export Panel

The British Standards Institution announces the formation of a small export panel consisting of leading industrialists who are actively engaged in the markets of the world. The panel will advise B.S.I. on how best it can assist export trade.

The volume and range of overseas work connected with standards has increased greatly in recent years, and has become a factor of growing importance to our exporting industries. The development of national standards in overseas countries has a direct bearing on British manufacturers' export activities, and therefore demands that British industry should, through the B.S.I., take a leading part in influencing developments in the international standards field. Fundamentally B.S.I.'s job in this sphere is to limit the necessity for British manufacturers to produce a variety of goods to comply with a variety of different standards in different countries. It is necessary that in formulating British standards full account should be taken of the requirements of export markets as expressed in their own standards.

The proper execution of this service to British industry calls for the best guidance which exporting industry can offer to B.S.I., and it is on these levels that the new export panel will operate. One practical task will be to suggest ways in which the use of British standards overseas can be promoted, and how availability of British standards in all parts of the world can be improved.

The entrance hall of the new office block of Wickman Ltd., Coventry. *(General Electric Co. Ltd. photo).*

The Concept of Colour Temperature in Relation to Colour Film Processes

By R. L. HOULT, F.R.P.S, F.B.K.S

Colour Temperature

The term " colour temperature " is used to denote the visual colour of an incandescent black body(1). It is measured by the absolute temperature of the body in degrees Kelvin. If, at any temperature of incandescence, a body emits a spectral distribution proportional to, but of lower brightness than, a black body, it is called a grey body. Should, however, the relationship between a body and a black body at any temperature of incandescence not be constant throughout the visual spectrum, then that body is termed a selective radiator(2).

It will be noted that colour temperature (C.T.) is a visual concept derived from a black body possessing a continuous distribution of brightness throughout the visual spectrum. A selective radiator may nevertheless provide a visual match for a black body at some temperature of incandescence. Under these conditions its colour is denoted by the colour temperature of the matching black body.

Notwithstanding this definition of the C.T. of a selective radiator, it does not follow that the selective radiator is a satisfactory light source for a colour film process balanced to that C.T.

Practical sources of light are seldom black body radiators. They may be grey bodies (as in tungsten lamps) or selective radiators (as in high intensity arcs, electronic discharge tubes or filtered tungsten lamps).

The indiscriminate use of the term colour temperature to describe the colour of almost any light source (whether it matches black body radiation or not) is an unfortunate consequence of its introduction into the lay vocabulary. The occasion for this situation was the increasing use now made of colour film processes in photography, and the purpose was to denote the relationship between the colour balance of the film and the spectral composition of the light by which the film was exposed.

Spectral Sensitivity of Colour Film Processes

Not only are most light sources not black body radiators, but also most colour film processes do not necessarily require black body radiation to give an optimum colour balance. This is due to the nature of their spectral sensitivity, which in general comprises three overlapping response bands as shown in Fig. 1.

Provided the distribution of brightness throughout the visual spectrum is related to the envelope of these three curves, as good a colour rendering will in practice be obtained as if black (or grey) body radiation had been emitted by the light source.

Thus, when discussing the lighting requirements of colour film processes it is sufficient to use the term " effective colour temperature " (E.C.T.). The term E.C.T. can be defined as the colour of a light source which has the same photographic effect on colour film as a black body radiator of numerically the same C.T.

Colour Temperature Meters

For these reasons the use by photographers of colour temperature meters may often be of questionable value. A C.T. meter calibrated with a black body radiator will sometimes denote discrepancies in the E.C.T. of a selective radiator which would not be reproduced by the colour film process. Alternatively, the C.T. meter may give an indication of appropriate C.T. from a selective radiator, to which the colour film process may be out of balance. This is especially true if the C.T. meter possesses only two response bands. These errors may be reduced to a minimum if the design of the C.T. meter is such that its response bands correspond closely to those of the colour film process. One such type of meter (the Spectra three-colour meter manufactured by the Photo Research Corporation, Burbank, U.S.A.) gives a blue/red reading with a separate green component, thus indicating the errors in balance between lighting and film in two response bands. Indications of this type may be useful on occasion, but it is to be doubted whether the accuracy of calibration of colour temperature meters in general remains as constant over a period of use as does the spectral composition of any one type of artificial light source maintained in its optimum condition. Should this doubt be justified, it may be concluded that greater reliance should be placed on the stability of the photographer's lights than on the accuracy of any measurement of E.C.T. which he may be able to make by commercial C.T. meters. Where accurate control of C.T.

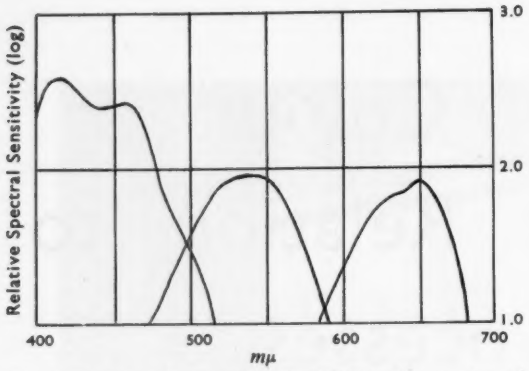


Fig. 1. Eastman colour negative film (5248). (By courtesy of Kodak Ltd.)

is important it may be obtained by the selection of lamps, themselves manufactured to a specific C.T. rating, in good condition, together with good control, or at least indication, of their operating voltage, etc. On those occasions when it is required to use two-colour meters —at present the most common design—these should be restricted to the measurement of the C.T. of tungsten lamps only: all other sources being matched visually to the tungsten sources so measured.

Artificial Light Sources

In general, artificial light sources should be selected which possess a spectral distribution of brightness which corresponds closely with black body radiation. This reduces to a minimum any errors associated with the matching of a light source to a colour film. As an example, based on practical experience, the following types of artificial light sources are considered satisfactory in this respect:—

(i) Tungsten lamps.
(ii) High intensity carbon arcs with white-flame carbons from which any excessive blue-violet radiation has been removed by filtering with a pale amber filter.
(iii) Electronic flash tubes (Xenon-filled).
(iv) Flash bulbs (filled with metal foil or wire).

All these light sources can be used to give satisfactory colour rendering on modern colour film processes, possibly with the aid of a supplementary filter to correct the E.C.T.

E.C.T.—Conversion Filters

It frequently happens that it is desired to expose a colour film process by light of an E.C.T. to which the film is not balanced. This can be accomplished providing the E.C.T. of the light source be converted to the required value by means of a suitable filter. This filter may be placed either over the light source or over the camera lens, but in either position it serves the same purpose—to effect a balance between the colour of the light source and the spectral response curves of the colour film process. It may be a carefully designed filter with a continuous spectral conversion characteristic, intended to give an accurate change of C.T.; or it may possess spectral absorption bands which correspond to the

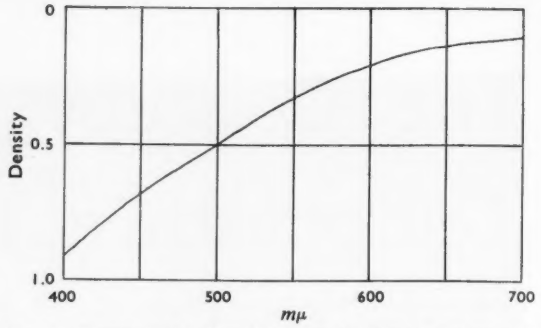


Fig. 2. Chance 41B29 filter (130 mireds). Made to reduce a C.T. of 5,400 deg. K. to 3,200 deg. K. approx.

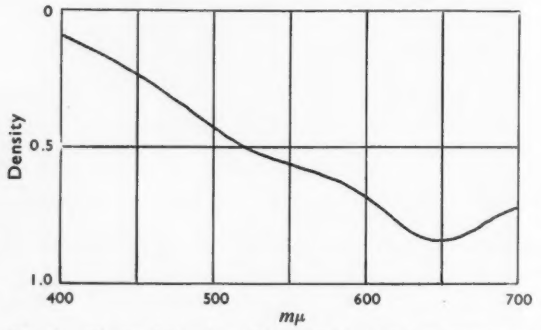


Fig. 3. Chance OB8 filter (130 mireds). Made to raise a C.T. of 3,200 deg. K. approx. to 5,400 deg. K.

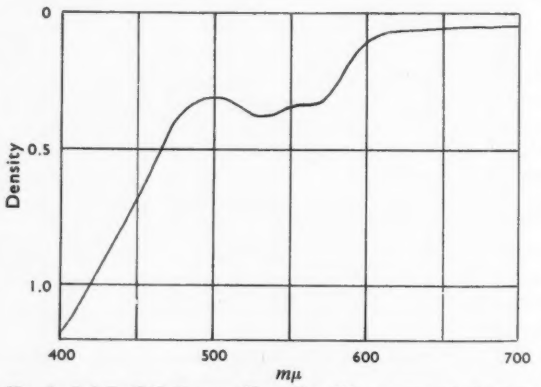


Fig. 4. J.A.R. C.T. Orange filter (less Y1 component). Dyed acetate sheet with a similar E.C.T. step to Fig. 2.

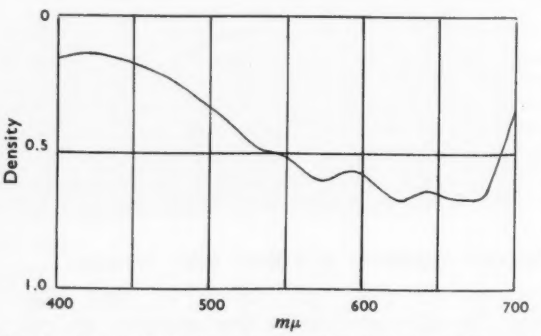


Fig. 5. J.A.R. C.T. Blue filter. Dyed acetate sheet with a similar E.C.T. step to Fig. 3.

envelope of the film response bands, when a satisfactory change of E.C.T. only is obtained.

In general, two broad absorption bands are all that are required. They may be either blue and green (for the reduction of E.C.T.) or green and red (for the raising of E.C.T.). Transmission curves of specimen filters of these types are shown in Figs. 2 to 5. Certain commercial filters exist which purport to serve this purpose, but whose transmission curves are as in Figs. 6 and 7.

Consideration of Figs. 6 and 7 will show that these filters possess absorption bands at 490 millimicrons and 615 millimicrons respectively. These positions correspond in general with the overlapping portions of the spectral response curves of colour film processes, where sensitivity is at a minimum. Hence the visual effect of these filters does not correspond to their photographic effect. This is a serious inconvenience to the photographer who wishes to judge the photographic effect of his lighting from its visual appearance.

Standardisation of E.C.T. and Conversion Filters

Modern colour film processes are in general used with either of two different types of lighting, known colloquially as "white" and "incandescent." This distinction is one of degree only, since these terms can describe radiations from the same source at different C.T.s. Generally, the term "white" corresponds to a range of some 5,000-6,000 deg. K., while "incandescent" corresponds to some 3,000-3,400 deg. K.

The corresponding types of colour film are generally described as "balanced to daylight" and "balanced to artificial (or tungsten) light." Both types have their respective uses and both will probably continue to be manufactured. There seems, therefore, to be a case for the acceptance of two standard C.T.s, to which these two types of film are respectively balanced in manufacture. Such standardisation would assist trade in these products between different countries. Corresponding standardisation of certain artificial light sources would be equally beneficial. A further consequence would be that a simple range of E.C.T.-conversion filters could be produced for accurately converting one C.T. to the other, either in a single step or in a series of intermediate steps. Such a range of conversion filters in conjunction with the two standard light sources would provide photographers with the means to obtain several specific E.C.T.s at will, whereby they could produce a number of distinctive photographic effects characterised by their generally recognised colour temperatures, for example—moonlight, lamplight, firelight.

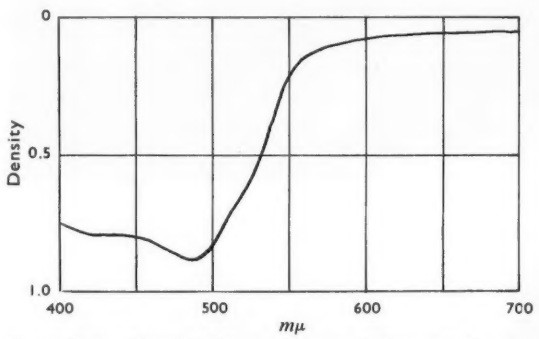


Fig. 6. MT2 + Y1 gelatin filters. Commercial filters which are intended to have a similar E.C.T. step to Fig. 2.

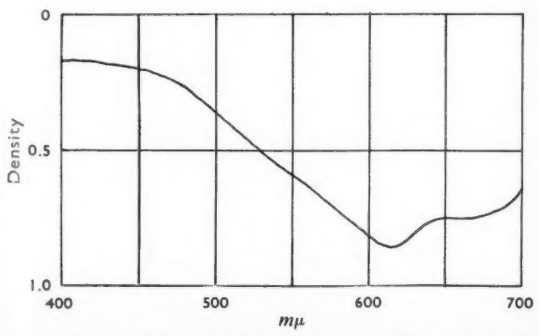


Fig. 7. Corning Whiterlite filter. A commercial filter which is intended to have a similar E.C.T. step to Fig. 3.

Suggested standard colour temperatures are as follows:—

"White" ..... 5,400 deg. K.
"Incandescent" ... 3,200 deg. K. } Step = 127.3 mireds.

5,400 deg. K. is the approximate C.T. of the sun as viewed from the earth's surface under suitable atmospheric conditions(3). It is also the approximate C.T. of high intensity arc-light as commonly used in motion picture film production (e.g., as provided by a Mole-Richardson type 170 H.I. arc burning Morganite white-flame carbons, covered by a Brigham Y.1 gelatin filter).

3,200 deg. K. is the C.T. to which the majority of artificial-light colour film processes are balanced at the present day. It is also readily obtainable in practice by the use of "3,200 K." tungsten lamps, manufactured in several countries. These lamps are usually rated at 3,250 deg. K. when new. The tendency to lose C.T. with age, etc., results in a mean C.T. of 3,200 deg. K. during their working life.

Suggested standard C.T. filter steps are as follows:—

Full step = 128 mireds
Half step = 64 mireds
Quarter step = 32 mireds

and so on in the same series.

Steps of less than 32 mireds are not normally required for producing photographic lighting effects. They may, of course, be required for other purposes, such as matching a given film to a light source of incorrect C.T.

To illustrate these proposals, the two types of light source and the three types of C.T. filter listed have been adopted for general use in motion picture production and still photography at Pinewood Studios, England, where experience is now being accumulated in their use(4).

References

(1) J. W. T. Walsh, Photometry, p. 271, (1926).
(2) Ibid., p. 38.
(3) Ibid., p. 38.
(4) R. L. Hoult, Standardised light sources for colour photography. Brit. Kine. **24**, 72, (1954).

Recent Office Lighting Installations

(1) A General Office

At a large new office of Sedgwick Collins and Co., Ltd., insurance brokers, in the City of London, " Mazda " 5-ft. all-" Perspex " fluorescent luminaires have been installed.

Over 100 of these all-purpose luminaires have been used to give over 30 lm./ft.^{2} on the working plane.

In the area concerned an office staff of 138 handle large quantities of paper work—much of it in longhand—and operate numerous electric calculating and accounting machines. A false ceiling of Cullum's " Acousti-Celotex " sound absorbent boarding and double windows reduce noise to a minimum. Matt horizontal surfaces on the steel office furniture avoids troublesome reflections of luminaires.

(2) Private Offices

A number of directors' rooms and executive offices at Imperial Chemical House, Millbank, London, have recently been relighted with G.E.C. cold cathode luminaires. The luminaires are of two sizes, one to take 30 ft. and one to take 50 ft. of cold cathode tubing in spiral formation, the sizes being selected according to the size and height of the rooms and the number of luminaires installed in each. " Natural " colour tubes are used. The mounting height of the luminaires above the floor is about 13 ft. Supplementary lighting is obtained from a single row of " Natural " cold cathode tubes mounted in the cornice.

A feature of these installations is the manner in which the lighting seems to emphasise the beauty of the room, whether the wall panelling is light or dark or unpolished lined oak, while the style of the luminaires tones with the furnishing.

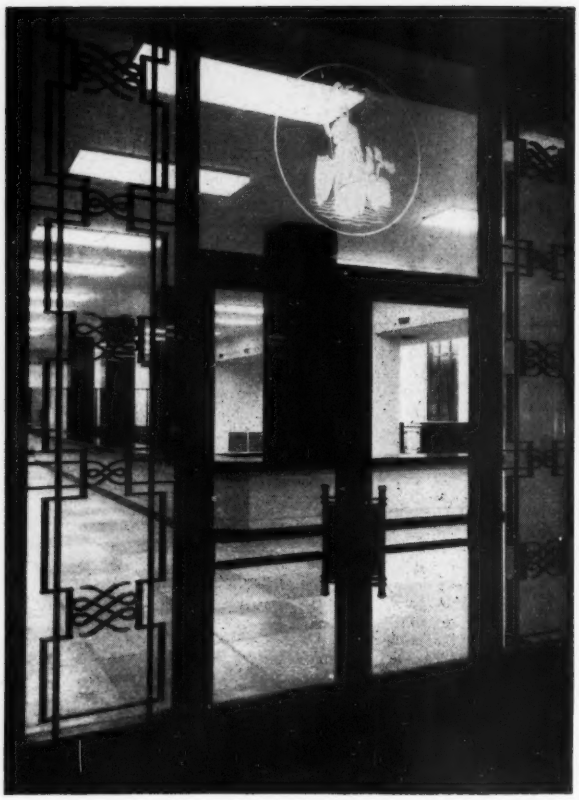
(3) A Bank in Hong Kong

In the new Hong Kong branch of the Mercantile Bank of India fluorescent lighting is used exclusively. The average iliumination on the working planes of desks and counters averages 25 lm./ft.^{2}.

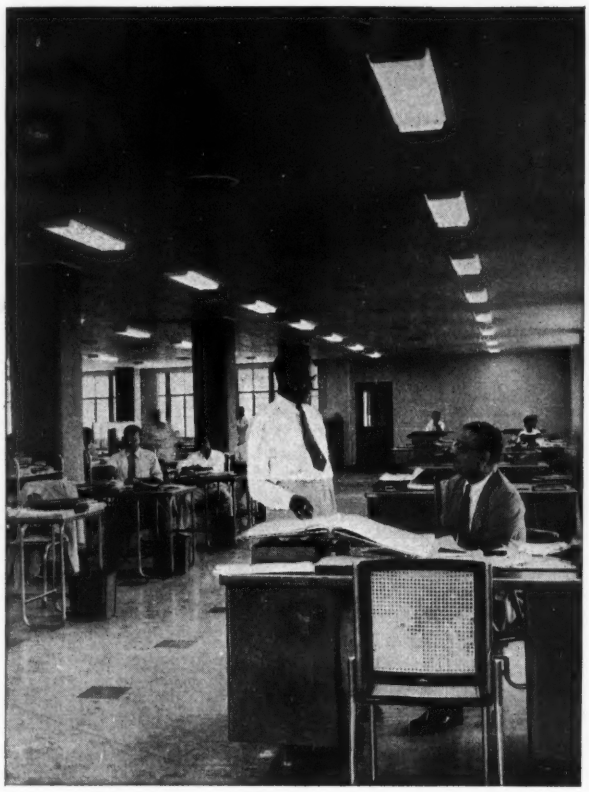
In the main banking hall the architects have provided two rows of 10 recesses, 6 ft. x 2 ft. and 8 ft. x 2 ft. in the concrete ceiling. Each recess is lined with a white asbestos board reflector, concealing the 'Quickstart' control gear, and contains six 3-ft. 30-watt or 4-ft. 40-watt "White (3,500 deg. K)" lamps. The openings are covered by "Louverene" panels—transparent fabricated polystyrene egg-crate sections—braced by clear "Perspex" strips and arranged to slide to one side to give access for cleaning and tube replacement.

For the mezzanine offices ceiling mounted luminaires are used. These accommodate one 5-ft. 80-watt "White (3,500 deg. K)" lamp behind a reeded "Perspex" diffuser.

All the luminaires, lamps and associated control gear, as well as several other luminaires used in the smaller offices, were made by Thorn Electrical Industries Ltd. and supplied through their Hong Kong representatives, the Jardine Engineering Corporation Ltd. The installation was designed by Palmer and Turner.



(4) New Offices in Bombay

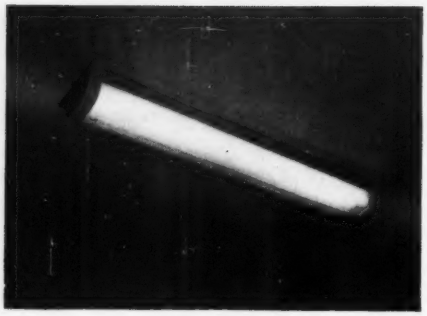


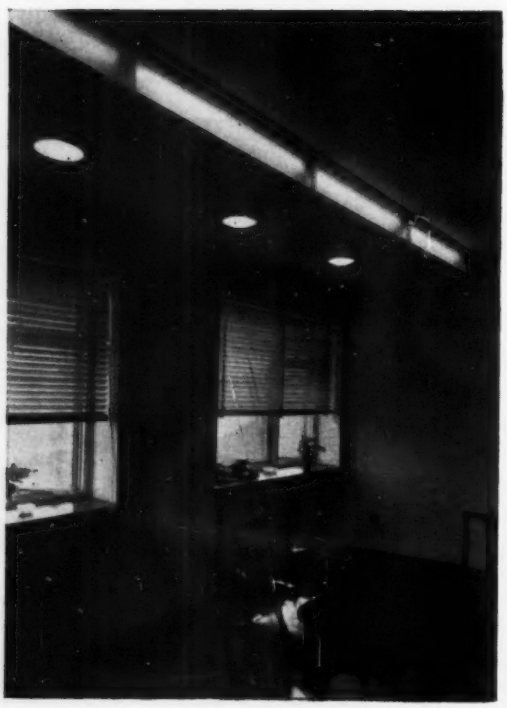
Beauty and comfortable working conditions were the architect's objectives in the design of new Bombay offices for the Standard-Vacuum Oil Company.

In planning the lighting installation it was decided to provide the high service illumination of 40 lm./ft.^{2} over the big floor areas, and to design a scheme which, viewed in perspective, would give the impression that the ceilings are higher than they actually are.

The question of lighting was studied in the earliest stages of planning the building. In collaboration with the oil company and Mr. John Ritchie, F.R.I.B.A., who was responsible for the interior architectural design, the G.E.C. of India prepared a scheme using hot cathode fluorescent lamps in special recessed ceiling luminaires made to give some light on the ceilings with the maximum downward distribution. Each luminaire accommodates four 4-ft. 40-watt daylight colour lamps. More than 1,000 of these luminaires are used in the building.

(5) New Offices for Chance Bros. Ltd.





In designing the new office block for Chance Brothers at Smethwick, the architects, Clifford Tee and Gale, were asked to use Chance building glasses wherever they might be appropriate. The aim of the architects has been to show original and varied uses of Chance products, allied to other building materials.

The entrance hall provides many interesting features. Part of it is used as a reception and waiting area, and is divided from the rest by a change in the flooring from rough-hewn slate to carpet. The ceiling echoes this partition with a recessed lighting panel above the carpet.

The lighting throughout the block makes use of various Chance Brothers' products, including the glass tubes of the fluorescent lamps. The fluorescent luminaires which are used throughout the offices were designed by the architects using Chance "luminating" glass in two pieces, an innovation for this type of luminaire which it is claimed reduces the price; changing of the lamps is simple because the glass can be rolled round to expose the lamps and there is no need to open the end plates. Filament spots in the ceiling of the entrance hall have bent figured rolled glasses of various patterns, or of "Fiesta" decorated glass.

Some Aspects of Lighting in New Zealand

By N. E. HAMMOND*

Before dealing with any particular aspect of lighting in New Zealand, it is felt that a background picture is essential.

New Zealand is a young country, being little over 100 years old, and its population—just over 2,000,000, including both European and Maori—is equivalent to that of Birmingham and Manchester combined, but it is spread over an area 2½ times as great as that of England. This population is mainly grouped in the four principal centres of Auckland, Wellington, Christchurch and Dunedin, and it is in these centres that the greatest strides in lighting development have been made. This applies particularly to interior lighting.

Despite the development of air transport, the country still remains one of the most isolated, its nearest neighbour, Australia, being 1,200 miles away. This isolation has had its effect in the lighting field in three main ways: (1) Lighting development has tended to lag behind that of other countries and the average New Zealander is not yet very "light conscious." This may, to a certain extent, be due to the fact that for a considerable time the country suffered from a shortage of electrical power. Now that this situation has been remedied, there will no doubt be a big improvement. (2) Where lighting development has taken place, it has tended to take on an individualistic character which, although on occasions commendable, has resulted in some garish lighting installations and designs of luminaires. This applies particularly to fluorescent lighting which has tended to be abused and misused. There is a general feeling that "anybody" can design a lighting installation. (3) The lighting engineer in New Zealand must be a "jack of all trades"; it is impossible for him to specialise in any one field of lighting as is done in Britain. He must have a thorough knowledge not only of interior illumination, but also of aerodrome lighting, street lighting, etc.

Standards of illumination are, in theory, based on the British I.E.S. Code, although in practice these standards are rarely achieved. The reason for this may be the comparatively small number of working hours during which it is necessary to use artificial illumination.

* The author is with the British General Electric Co., Ltd., Wellington, New Zealand.

Industrial Lighting

New Zealand has virtually no heavy industries as they are known in Britain though the construction of pulp and paper mills will probably lead to the use of blended light for the first time.

It can be said that with few exceptions fluorescent lighting has been universally adopted for industrial lighting. Until fairly recently the tendency has been to concentrate on the 4 ft. 40-watt fluorescent lamp, and there has been a definite bias in favour of this size of lamp. This is probably due to the influence of American lamps which were imported in considerable quantities during and shortly after the war. The industrial fraternity is, however, now beginning to adopt the 5 ft. 80-watt lamp; its life and performance have proved its worth, particularly in so far as maintenance is concerned—and with a shortage of labour this is a most important factor. An installation, once it has been put into service, is normally left untouched and lamps are not replaced until they burn out; the introduction of group lamp replacement schemes is proving a difficult matter. Instant-start circuits, which have been in use only during the last two or three years, are becoming more and more popular, and it is probable that one of the decisive factors accounting for this popularity has been that of maintenance.

The use of mercury vapour discharge lamps has not been widespread although, where adopted, they have given satisfaction. The combined mercury-tungsten lamp has been used to some extent, particularly where price and/or improved colour rendering are important. No doubt the introduction of the latest colour corrected lamps will increase the popularity of this form of lighting.

An example of the larger industrial installations in New Zealand is that of the workshops and offices of Tasman Empire Airways at Mechanics Bay, Auckland, where a total of more than four hundred 80-watt instant-start luminaires of various designs has been used. The installation in the new engine repair shop is illustrated in Fig. 1.

Commercial Lighting

In this field fluorescent lighting was probably installed with too much haste and too little discretion. The prospect of rich reward caused the invasion of this field from all directions with disastrous results. All types of lighting "experts" put in installations without proper planning and without consideration of the level of illumination required. In many instances this has earned for fluorescent lighting a bad name, and indeed such

Fig. 1. *Engine repair shop, Tasman Empire Airways.*

Fig. 3. *Close-up of luminaire seen in Fig.* 2.

Fig. 2. *Rendells departmental store, Auckland.*

lighting has been thrown out of a number of commercial establishments. A theory seemed to prevail that fluorescent lighting was the answer to every lighting problem and all sorts of complaints—imagined and real—resulted from this "gold rush." It has, however, had one good effect in that it has tended to revive interest in tungsten lighting, which, of course, if properly used either alone or in association with fluorescent lighting, can achieve most effective and pleasing results. This is already noticeable in a number of shops which have had their lighting installations redesigned when renovations have taken place.

The 8 ft. 125-watt lamp, for which it is understood little demand has been experienced in Britain, has achieved a certain measure of success in New Zealand, particularly in competition with cold cathode lighting, where a "tailor-made" job was not required and economics were the deciding factor. An installation at Rendells departmental store in Auckland, comprising one hundred and twenty 8 ft. 125-watt special luminaires with a "W" design of louvre, is illustrated in Fig. 2; a close-up of the luminaire is shown in Fig. 3. In this instance the purchaser required something different from the usual type of "egg crate" louvre and also favoured continuous line type of lighting. The difficulty was to provide an original luminaire of pleasing appearance which would also give a good lateral cut-off. As a result the "W" design of louvre was adopted and has proved extremely satisfactory. Instant-start equipment is used throughout and an overall average illumination of 20 lm./ft.^{2} has been achieved.

A further installation of interest, also using 8 ft. 125-watt instant-start units was recently erected in the main drafting room of the Ministry of Works in Auckland. Again the continuous line principle was adopted, the total of 28 luminaires being mounted in four rows of seven. Each unit is enclosed in white crinothene and is joined to its neighbours by means of 030 white opal "Perspex" bands. Clear "Perspex" bands were mounted inside the crinothene so that it would retain its shape. As will be seen from Fig. 4, the "Perspex" bands produce no shadow whatever on the crinothene. The installation gives an average illumination of 40 lm./ft.^{2} throughout the drawing office; to minimise the stroboscopic effect, the luminaires are distributed over the three phases of the supply.

Unfortunately, in the field of commercial lighting there are far too many installations where the old "chinaman's hat" type of reflector is still being used; indeed new installations of such fittings are actually being made. Nevertheless, the "Coolicon" type is slowly coming in to replace this relic of the past.

Public Buildings

In New Zealand the lighting of public buildings such as municipal offices, cinemas, churches, etc., follows British practice very closely. On the other hand, the installations are as a rule not so elaborate because of the high cost of importing special equipment and the limited facilities of local manufacturers. In the main, the simpler standard types of lighting units are employed.

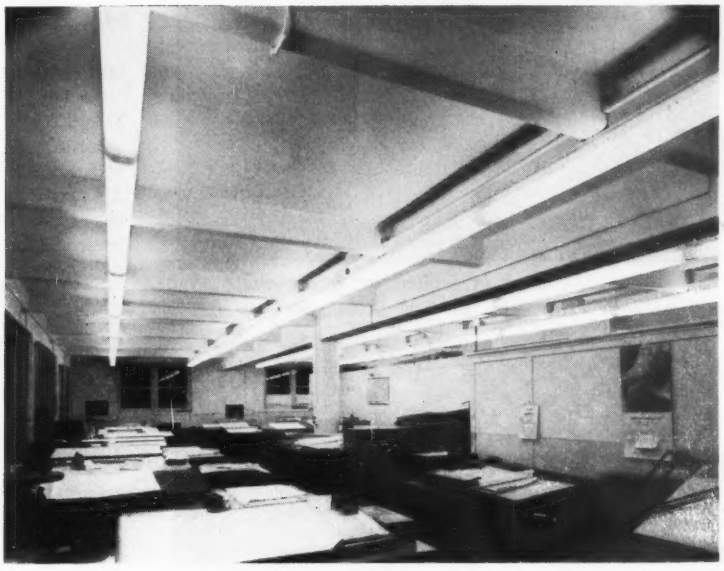


Fig. 4. Drawing office, Ministry of Works, Auckland.

An installation recently carried out in one of the main churches in Wellington proves very conclusively that a modern lighting medium, such as fluorescent lighting, can be incorporated into a Gothic style of architecture and at the same time reveal hitherto unsuspected beauties of the interior. The writer has always felt that the use of fluorescent lighting in churches was a matter to be approached with caution. However, there is no doubt that in the installation referred to the use of this lighting medium has proved the ideal solution. The two illustrations in Figs. 5 and 6 emphasise the striking contrast between the old and new forms of lighting. Fig. 7 is a close-up of one of the luminaires used in the main body of the church and in the two aisles; it houses three 4 ft. 40-watt warm white lamps mounted vertically and screened by three baffles of sand-blasted broad reeded glass. In all, 26 luminaires were installed, positioned in the angles of the pillars just above the capitals, as shown in the photographs. The side aisles, and the aisle behind the altar, are illuminated by single 5 ft. 80-watt luminaires in concealed positions, the altar and cross being high-

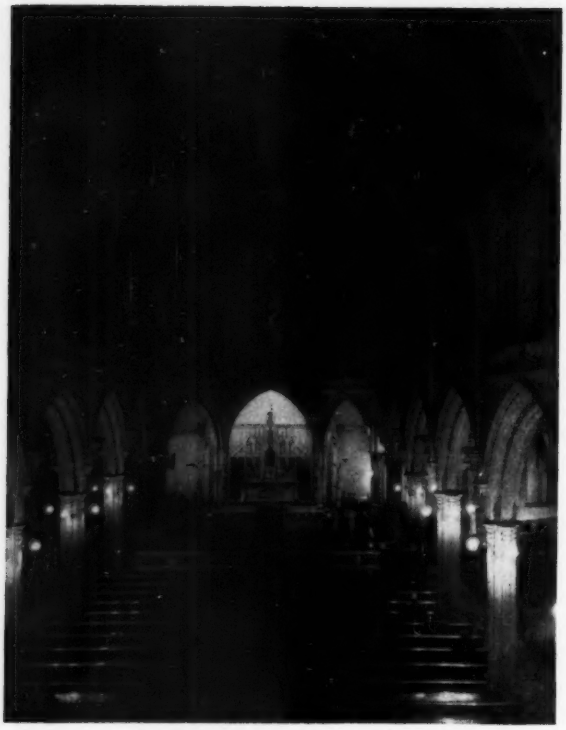


Fig. 5. Church in Wellington before and after (Fig. 6, below) installation of fluorescent lighting. Close-up of luminaire in Fig. 7 (right).

lighted by 150-watt concealed spotlights. A combination of warm white and mellow lamps is used and the result effected is extremely pleasing. The average illumination is 5 lm./ft.^{2}.

Street Lighting

With the improvement in the power supply situation it has been possible to make some progress with street lighting. There are, however, in New Zealand four main problems which are not generally encountered in Britain. These are:—(i) The exceptional width of roads to be illuminated, particularly in provincial cities and towns where the width may be anything from 60 ft. to 90 ft. (ii) Verandahs which project from the building face to the kerb edge. (iii) The almost universal use of overhead reticulation. This, in conjunction with Post Office poles, means that wherever possible existing poles have to be used. The installation of new poles would not only increase the density of the "forest" but would also

represent considerable expense. (iv) The existence of series street lighting circuits, particularly in the South Island.

The problem set by the width of the roads is a very difficult one to solve. Admittedly the use of lanterns employing horizontal burning lamps is of assistance, but unfortunately in some cases it is not possible to use the Post Office poles which run along one side of the street in conjunction with the power supply poles on the other. The only way to solve the problem of exceptional road width would seem to be to decrease the spacing between lanterns, but the existing poles may still be 2½ chains apart and new poles cannot be considered. The question of economics must also be considered because city and borough councils do not receive grants from the Government to assist in the installation of street lighting on main highways within their boundaries as is the case in Britain. It is difficult at the present time to see any really satisfactory solution to this problem.

The verandahs alongside the roads prove a dis-

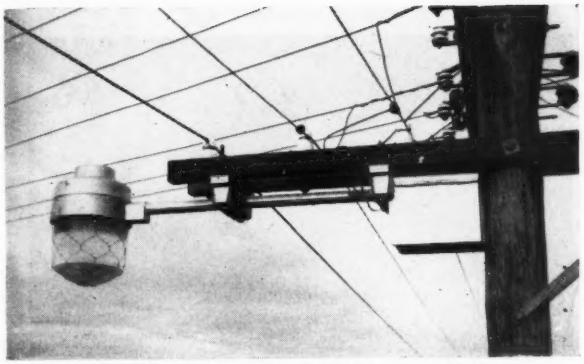


Fig. 8. Common type of lantern mounting.

advantage in that no assistance is obtained from reflection from the building face on to the road surface. The consequent loss of road surface illumination has to be made good by using lamps of larger light output.

The matter of overhead reticulation is one that cannot readily be altered, but, of course, it need not arise if lighting is being provided in a new street. The use of concrete poles is not widespread and generally lanterns have to be mounted on existing hardwood poles. The result is a variety of designs of supports and brackets, and the "artistic" effect varies according to the tastes of the local supply authority engineers. A typical lantern mounting is shown in Fig. 8, which gives some indication of the problem involved.

The use of series burning street lighting lamps is steadily decreasing, but the system is still common in the South Island. No standard fittings for this system of lighting are in use in the United Kingdom, but special fittings have been designed, of the totally-enclosed type, using an inner refractor and outer bowl. One of the main arguments in favour of retaining these series lighting circuits is the greater life of the lamp, and in a country where labour is scarce the maintenance factor is most important.

Fluorescent street lighting is being installed in some cities, but whether it will achieve great popularity in New Zealand is doubtful on account of the physical dimensions of the lanterns and consequent wind resistance. Wind is a major problem in New Zealand, particularly in the capital city of Wellington where no fluorescent street lighting units can at present be considered. Economics also play their part. The cost of a three-lamp 80-watt lantern manufactured in the United Kingdom and shipped to New Zealand varies from £60 to £70, to which must be added sales tax at 20 per cent.

At the present time there appears to be a slight increase in the popularity of sodium street lighting units at the expense of mercury vapour, and to-day both types are being installed in roughly equal quantities. The choice between sodium and mercury vapour rests with the particular supply authority engineer concerned and, of course, opinions differ. No doubt when the 400-watt HPMV Improved Colour-Corrected Lamp becomes available it will be widely used.

The foregoing covers but a few aspects of lighting in New Zealand. No doubt during the next few years great strides will be made as the country becomes more and more "light conscious"!

Book Review

Control Gear and the Control of Fluorescent Lamps. By C. H. Sturm. Second edition. Pp. 263; *Figs.* 142; *Tables* 46. *(In German.)*

The author states, quite rightly, that most books on fluorescent lamps are written primarily with the physicist or the illuminating engineer in mind rather than the electrical engineer. There is no doubt that the present small volume contains a wealth of information which makes it a most valuable vade mecum for those concerned with the installation and maintenance of fluorescent lighting installations of all kinds. In addition to the text descriptions, which are lucidly written, there are numerous circuit diagrams, tables giving the values of capacitors, inductors, etc., suitable for a wide variety of conditions and graphs showing the electrical behaviour of the lamps in different changing circumstances. There are also a number of half-tone illustrations of lamp auxiliaries of all kinds. If there is a criticism, it is that the lamps made in this country do not seem to have received as much consideration as those made in Germany, Holland or the U.S.A. J. W. T. W.

SITUATION VACANT

Fully trained LIGHTING ENGINEER required for London office. Applicant must be well educated and conversant with modern lighting methods. Apply Senior Lighting Engineer, Ekco-Ensign Electric Ltd., 45, Essex-street, Strand, W.C.2.

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Beautifies, and attracts with its modern concealed lighting effect.
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Floodlighting for Tennis

General view of the installation at the Paddington Bowling and Sports Club.

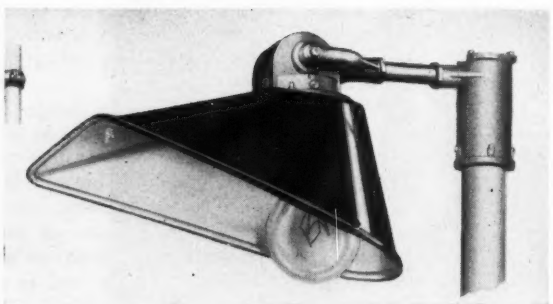
It is only recently that leading tennis organisations in this country have actively backed floodlit tennis, though it is well established in many other countries, particularly in the U.S.A. and Australia. In Sydney alone there are said to be over 1,200 courts. The first of what may well become a large number of new tennis floodlighting installations in this country has been completed at Paddington Bowling and Sports Club.

The new lighting at Paddington was installed to provide playing conditions comparable to those experienced in daylight. It allows first-class professional and amateur play in the evening and has already been very favourably commented on by leading players who are familiar with floodlighting abroad.

The installation consists of 10 " Mazda " " 9 " projectors housing 1,000-watt GLS lamps, which have been designed to give an even distribution of light over a definite area. By mounting them in parallel lines on steel poles on each side of the court at 23-ft. centres and at a height of 20 ft., it has been possible to overlap the light projected by each fitting and to produce an extremely uniform light distribution over the whole court with very little wasted light.

The " cut-off " of the projector as positioned is such that the lamp filament is hardly visible to the player serving. There is spill light at the centre of the court to a height of 24 ft., and in practice it has been found that this gives adequate light for players to deal satisfactorily with most lobs.

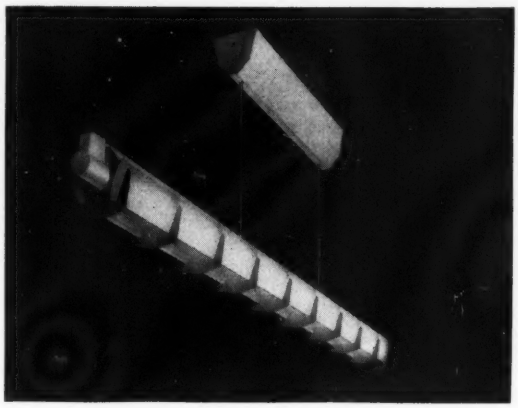
Electrical contractors were R. J. Stearne, of Luton.



Appearance on the court at night.

LUMINAIRES

No. 6



A single 80-watt 5-ft. fluorescent luminaire designed by the Building Research Station and developed and manufactured by Ekco-Ensign. This is a pendant fitting and consists of a ceiling box containing switch start control gear and a spine supporting the fluorescent lamp, transverse metal louvres and diffusing opal "Perspex" side screens. Modern in appearance and designed with a functional approach. Suitable for all forms of general purpose lighting. In particular it meets the rigid specifications for school lighting.

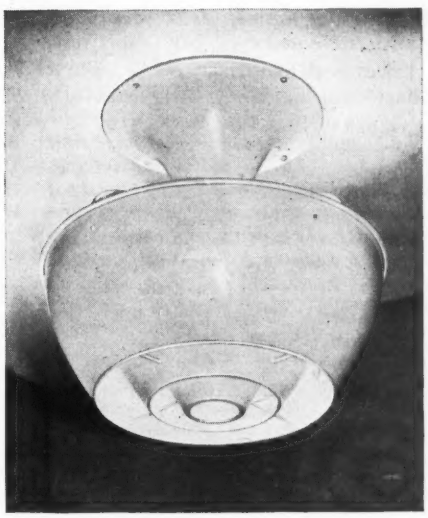
Price, £12 2s. 2d.

EKCO-ENSIGN ELECTRIC, LTD.

A luminaire designed for use in school halls where not only adequate illumination is required but the luminaire must be strong enough to withstand the impact of balls. The unit consists of a metal bowl 18 in. diameter with a 12-in. hole in the bottom fitted with a louvre. This bowl is fitted to the upper flared reflector by mild steel supports, and the whole assembly is carried on a 12-in-diameter steel ceiling plate. The plate is detachable and carries a porcelain holder. Designed to take a 300/500-watt G.L.S. lamp. It can be arranged for catenary wire suspension, and the fittings can be raised or lowered for re-lamping and cleaning.

Price, £12 8s.

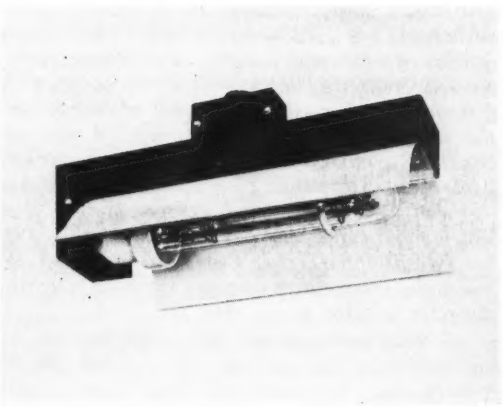
THE GENERAL ELECTRIC CO., LTD.

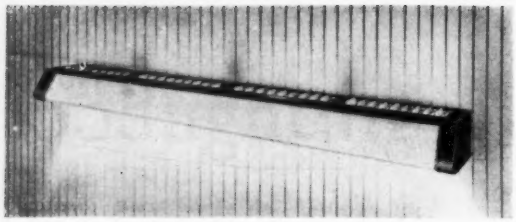


The design of this luminaire for high bay lighting is based on the high efficiency, cleanliness and accurate optical control obtainable when standard long arc mercury lamps are operated horizontally. Developed from earlier types, this luminaire has improved appearance and rigidity and is cheaper. It is available with or without magnetic arc control. The anodised aluminium reflector is detachable in a few seconds with one hand and without removing the lamp. Weighing only a few ounces each, replacement reflectors for a whole shop may be carried on a maintenance round. The profile of the reflector gives almost symmetrical distribution for spacing/height ratios up to 1.2:1.

Price, £6 (incl. gear).

THE BRITISH THOMSON-HOUSTON CO., LTD.





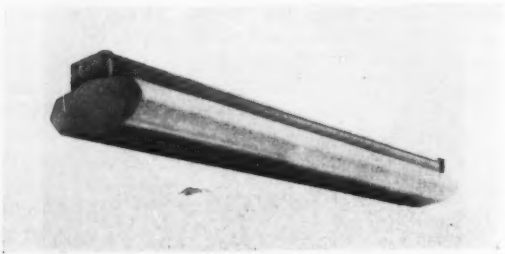
Two attractive luminaires (a wall bracket and a bedlight) using 12-in. architectural lamps for those who want to make their home lighting more attractive at low cost. The fittings are the F32078 wall fitting and a bedlight, F32079.

The wall fitting is made in cream or green moulded plastic and is specially suitable for use in bathrooms either above or on both sides of wall mirrors. It can also be used as a small ceiling fitting or decorative wall bracket.

The bedroom fitting has a cream plastic hood with spring clips for gripping a bed headboard or a dressing-table mirror. It is wired complete with 9 ft. of flexible and cord-pull on-off switch.

Prices (with lamp):—Wall Bracket, £1 3s. 6d.
Bedlight, £1 16s.

THE GENERAL ELECTRIC CO., LTD.



A new plant irradiator in which the plant coverage is increased by 50 per cent. The reflector is made of super-purity aluminium. It has a highly efficient reflecting surface and is designed to concentrate the maximum amount of energy over the working area. The small size of the unit obstructs a minimum of daylight. It is strongly made and rustproof throughout. An Osram 400-watt MA/V soft glass mercury lamp is used which gives 10 per cent. more light than the MA/H hard glass lamp it replaces, and as it is cheaper, the initial and replacement costs are lower. A magnetic deflector is fitted to the reflector.

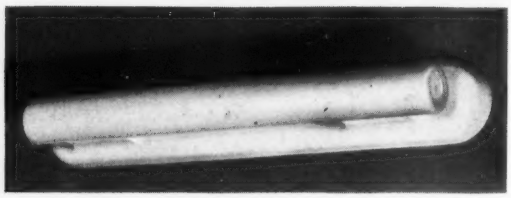
Price (with gear and magnetic deflector), £13 18s. 4d.

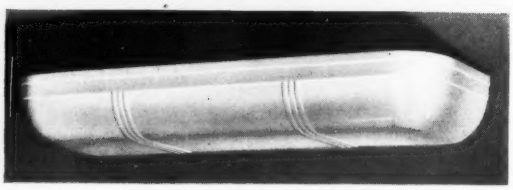
THE GENERAL ELECTRIC CO., LTD.

This decorative cornice luminaire is designed for use with one 80-watt 5-ft. fluorescent lamp. Constructed of reeded "Perspex" panels and metal louvres, both of which can be supplied in a variety of colours to blend with existing colour schemes. The light from this fitting is mainly in an upward direction, and there is also an attractive diffusion of light outwards through the Perspex panels and downwards through the metal louvres.

Price, £22 0s. 10d.

EKCO-ENSIGN ELECTRIC, LTD.

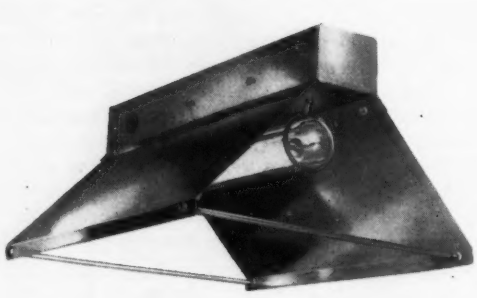




A commercial enclosed-type 5-ft. single or twin-lamp fluorescent luminaire. A smooth one-piece "Perspex" diffuser cover allows all-round light distribution, including both ends of the luminaire. Incorporates the "Pendicone" rapid installation system and fixed B.C. lampholders which permit re-lamping with either hand from either end of the fitting. The cover will hinge from either side of the gear channel to give access to the lamps and can be completely removed without undoing any screws or catches. Available ready wired for switch start or instant start circuits. Control gear is of the latest "brick" type, without any form of compound filling. "Permitol" capacitors are used.

Price (switch start single lamp), £15 5s. 3d.

THE BRITISH THOMSON-HOUSTON CO., LTD.



Lighting Abstracts

OPTICS AND PHOTOMETRY

535.23

72. An investigation of the damage hazard in spectral energy.

L. S. HARRISON. *Illum. Engng.*, **49**, 253-257 (*May*, 1954).

A series of relative damage factors relating the deteriorating effects (i.e., fading, embrittlement, etc.) of spectral radiation with wave-length have been used to assess the probable rates of damage of incandescent, fluorescent and natural illuminants when used in conjunction with glass and plastic filters. Assuming typical levels of natural and artificial illumination in a museum, the relative degrees of damage hazard from a range of light sources met with in a museum have been calculated. P. P.

535.24

73. A rectangular co-ordinate photometer for large-area luminaires.

J. A. LOSH. *Illum. Engng.*, **49**, 258-263 (*May*, 1954).

A method of photometry is described from the results of which can be calculated various photometric characteristics of large luminaires or luminous ceilings to which the inverse-square law does not apply. The method involves measurements of the illumination from the luminaires or ceilings at 1-ft. intervals on the walls and floor of a blackened enclosure. P. P.

LIGHTING

628.972

74. Lighting of colour spraying cabinets and spraying booths in motor repair works.

B. KNULL. *Lichttechnik*, **6**, 125-128 (*April*, 1954). *In German.*

Describes different methods of providing a high illumination on the work inside a cabinet used for spraying one or more complete automobiles. Sometimes the cabinet is windowless and the lighting is from special vapour-proof fittings at the top and sides. In other cases the cabinet has windows at the sides and top and the illumination is provided by rows of fluorescent lamps outside these windows. In open booths the work is illuminated from above by means of fluorescent lamps in flame-proof fittings. A number of illustrations of actual cabinets are given to show the different systems described. J. W. T. W.

75. Daylighting with plastic domes. 628.92

B. F. GREENE. *Illum. Engng.*, **49**, 209-214 (*April*, 1954).

Describes white translucent acrylic plastic domes of square, rectangular or circular shape which are mounted in metal frames and used as rooflights for the daylighting of building interiors. Calculations, based on the assumption that the domes are perfectly diffusing sources of light, have enabled illumination contours to be plotted for different layouts of rooflight. The economics of the system are discussed. P. P.

628.93

76. The lighting engineer's no. 1 tool—the lighting scheme.

J. WETZEL. *Lux*, **22**, 7 (*No.* 1, 1954) *and* 39 (*No.* 2, 1954). *In French.*

The development of the "lighting scheme" is discussed, and some of the errors and approximations involved are examined, e.g., the effects of non-uniformity of illumination and of reflection factors; approximations involved in the basic methods; depreciation factors; variations in performance of lighting fittings and approximations in presentation of their performance. Standardisation of methods of preparing and presenting the lighting scheme is suggested. The possibility of basing schemes on brightness rather than on illumination is discussed, and the author presses for (1) proper data of performance of lighting equipment by all makers; (2) a statement in all lighting schemes of the illumination chosen and the depreciation factor; (3) investigation of the possibilities of basing schemes on brightness; and (4) standardisation of calculation tables.

In the second part, the preparation of calculation tables is examined, and a new form of table proposed in which all calculation is avoided. Dourgnon's Harmonic Mean is used for the room index, and the tables are based on a quantity termed the "utilisation surface," i.e., that surface which in the interior concerned requires a flux from the lamps of 1,000 lumens to achieve an illumination of 100 lux (10 lm./ft.^{2}). The calculation of the number of lamps can be made by following a few simple tables; the object is to make the calculation suitable for non-technical persons to check. J. M. W.

628.92

77. Daylighting with a new kind of functional skylight.

R. A. BOYD AND J. L. REID. *Illum. Engng.*, **49**, 199-203 (*April*, 1954).

Part I describes a hollow glass block having prismatic inner faces, which has been designed for use in rooflights. The transmission of the block to summer and winter sunshine is discussed and typical illumination design data are given. Part II describes the application of the block to the daylighting of a Californian school. P. P.

628.93

78. Interflectance factors for additional combinations of reflectance.

W. M. POTTER AND C. WELLNER. *Illum. Engng.*, **49**, 216-219 (*April*, 1954).

Tabulates recently determined interflectance factors (ratio of lumens received on working plane to lumens received on walls, ceiling or floor) to cover a range of ceiling reflection factors extending from 0 per cent. to 90 per cent. Interflectance factors are also given for extended ranges of wall and floor reflection factor with a single ceiling reflection factor of 90 per cent. P. P.

79. Public streets lighted by fluorescent lamps. 628.972.6

C. ROY-POCHON. *Lux*, **22**, 11 (*No.* 1, 1954). *In French.*

A simple exposition of street lighting principles and of the place of fluorescent lamps, with many illustrations of French installations. H.P.M.V. fluorescent lamps are mentioned. J. M. W.

LAMPS AND FITTINGS

535.37

80. Characteristics of phosphors. 621.327.43

C. E. WEITZ. *Illum. Engng.*, **49**, 227-235 (*May*, 1954).

A non-technical description of the different phosphors used in modern tubular fluorescent lamps, their principle of operation and the processes involved in their manufacture. Luminous efficiencies at present realisable are related to the theoretical maximum efficiency and an indication given of the reasons for the discrepancy. P. P.

621.327.43

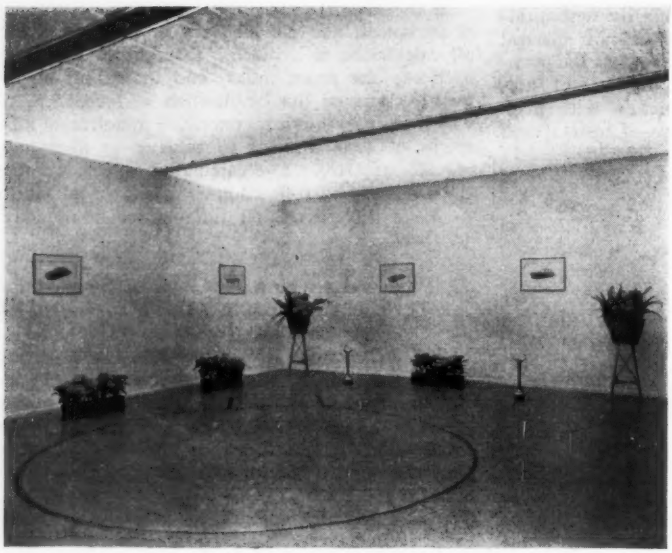
81. Effect of temperature on electrical and colour parameters of 40T12 fluorescent lamps.

C. W. JEROME. *Illum. Engng.*, **49**, 237-241 (*May*, 1954).

Reports measurements of the effect of ambient temperature on the electrical parameters, luminance and colour of 40-watt fluorescent lamps. Optimum electrical efficiency and maximum luminance were found to occur at an ambient temperature of 20 deg. C. Changes in colour with variation in ambient temperature were detected, but were not considered of sufficient magnitude to cause more than minor changes in colour rendering. P. P.

Lighting Installation

A Model Viewing Room

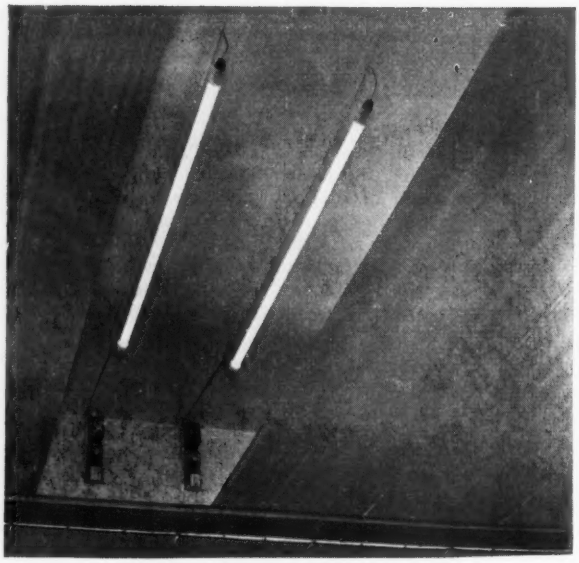


Very highly diffused lighting has recently been installed in the new model viewing room of the Pressed Steel Company, Ltd., Cowley, Oxford.

The room contains an electrically powered turntable on which full-scale motor-car models and prototypes can be examined from all angles, and the effect of alterations in shape and chromium trimmings studied in comfort. The type of lighting required in such a room presents a difficult problem, for while the illumination level must be relatively high, the brilliant highlights and sparkle which are usually associated with motor-car showroom lighting are not needed, as in fact these qualities make it more difficult to form an opinion of a new model.

The lighting scheme adopted takes advantage of two 20-inch deep transverse ceiling beams for the suspension of a false diffusive ceiling approximately 11 ft. above floor level. Forty-five Mazda 5 ft. 80-watt "Daylight" lamps are suspended on catenary wires 8 ins. above the ceiling, which is of "Tyglas" continuous filament glass cloth. Of five cloths tested this was found to be the best for the purpose, absorbing only approximately 20 per cent. of the total light output.

Gear for each lamp is mounted vertically on the side of the beams. The ceiling proper is painted white, and all wiring is covered in white P.V.C. Maximum illumination on the horizontal surfaces of models is approximately 25 lumens per sq. ft. Although originally installed experimentally, the lighting scheme has proved extremely efficient and no major alterations are contemplated.



Designed by :—B.T.H. Co., Ltd., in collaboration with the Pressed Steel Co., Ltd.

Installed by :—The Pressed Steel Co., Ltd.

I.E.S. Activities

Bath and Bristol Centre

A dinner and dance of the Bath and Bristol Centre was held at the Grand Hotel, Bristol, on April 2. It was the first event of its kind held, as previous functions have been confined to annual luncheons and dinners. This was the first time the ladies had been able to be present and the function was such a success that it has been decided to make this an annual event.

The guests included Councillor Hugh Roberts, F.R.I.B.A., Mr. W. R. Stevens (President) and Mrs. Stevens, Mr. Guy Campbell (Vice President) and Mrs. Campbell, and Mr. F. Chappell, Secretary of Gloucester and Cheltenham Centre.

The toast of the Society was very ably proposed by Councillor Hugh Roberts, of Bath, and responded to by the President. The Centre Chairman, Mr. R. W. Steel, gave a brief resumé of the year's activities and thanked his committee for their help in making this a successful year.

Newcastle Centre

Summer Activities

The Newcastle Centre has again held a trip down the River Tyne. It will be remembered that they made an experiment on these lines last year when some 560 persons were entertained. This year, however, the weather was not quite so good, the novelty of the event had lessened slightly and consequently there were only 365 persons present.

As can be seen from the photograph, which includes the Chairman, Mr. C. C. Veitch and Mr. P. S. J. Underwood (loud hailer), who was responsible for controlling the boarding of the vessels, everyone was in gay spirits—quite literally at the end of the trip if not at the beginning because, as last year, the vessels had fully licensed bars installed. This was a feature of the trip last year when the Newcastle Centre caused these licences to be issued for the first time in the history of the River Tyne.

Top: Bath and Bristol Dinner-Dance. Left to right, Mr. Hugh Roberts, Mrs. Campbell, Mr. R. W. Steel, Mrs. Steel, Mr. W. R. Stevens, Mrs. Stevens, Mr. H. G. Campbell.

Centre: General view at the Bath and Bristol Dinner.

Bottom: Newcastle Centre outing on the Tyne.

POSTSCRIPT By "Lumeritas"

The discussion on the meaning of "visual comfort," which I attempted to stimulate in these columns some months ago, has disappointed one of my American readers, who has now sent me his own contribution to it. He is Mr. H. L. Logan, who is vice-president in charge of research of the American Holophane Company, who will be remembered by readers who attended the Eastbourne Summer Meeting of the I.E.S. in 1952 for the interesting paper he presented during that meeting. Mr. Logan writes: "Visual comfort, as I understand the concept in an engineering framework, refers to the behaviour of individuals as expressed by their conscious response to the presence or absence of glare. It is the feeling, or sensation (as understood here), evoked by the presence or absence of brightness peaks or valleys outside the range of optimum adaptation of the observer. It has nothing to do with an observer's feeling of pleasure in the visual scene, nor displeasure with ugliness. Neither does it have anything to do with the sense of satisfaction or dissatisfaction derived from the reports of various organs of the body; which reports are the results of information gathered at the involuntary level by the human visual system, which gives rise to a feeling of security or insecurity in a given environment." Now, this conception of visual comfort as being simply conditional upon the absence of glare seems to be shared by, among others, the purveyors of tinted spectacles, but, of course, visual comfort also depends on the amount of illumination being sufficient for excessively close viewing to be avoided, as well as upon the absence of "uncorrected" anomalies of the visual system, such as errors of refraction and ocular muscle imbalance. I can agree with Mr. Logan that any feeling which can properly be described as one of "visual comfort" is different from the feeling of pleasure which may be evoked by a scene. The latter is an "aesthetic feeling," while the former is, in my view, an organic or somatic one, so that I cannot concur with the last statement in Mr. Logan's letter. His first statement I take to mean that one is conscious of visual *discomfort* in the presence of glare, but I wonder if he means that one is also definitely conscious of visual comfort in the absence of glare?

The exclusion of unwanted light by those with leisure for televiewing in daytime seems to be having unforeseen "side-effects." It is said that women who have drawn the curtains in daytime to prevent picture contrast degradation have been complaining that their curtain material is faulty or shoddy, because the weave is so apparent when the outside light is strong. Lined curtains would prevent this discontenting appearance, but linings are now widely dispensed with as a measure of economy. However, rumour has it that as television installations mount so do the sales of better-quality curtains and lining materials. This may be so, and if so, "it's an ill wind, etc.," but rumour is notoriously a lying jade. Back-lighting is, of course, used by the manufacturers of woven fabrics for revealing faults, but, anyway, most "heavy" curtains are intended to be seen by reflected light and can only look their best this way. Another instance of a particular method of lighting showing up defects not otherwise noticeable may be mentioned. I recently employed a builder and decorator to "make good" and paper the walls of one of my rooms. He did the work by daylight and thought it well done. By night, however, the glancing light from wall luminaires showed up many "proud" spots and undulations of the wall surface which the decorator thought he had removed. He called my lighting "killing"—it certainly was destructive of his complacency, and probably of his profit too!

Apparently the Council of Industrial Design took over the censorship of street lamp-post designs from the Royal Fine Art Commission two years ago and now has a list of 300 approved designs. This seems a truly remarkable number, and it includes at least one product of every known lighting column manufacturer. In future only designs approved by the Council will be acceptable to the Ministry of Transport for trunk road lighting, to the installation cost of which the Ministry makes contributions. Starting from January next all designs previously passed by the Fine Art Commission, but not now approved by the Council of Industrial Design, will be withdrawn, and this process is expected to take five years. From so many designs it should surely be possible to select examples which will "blend" reasonably well with every kind of environment traversed by lighted roads.

In the first number of the American journal, "The Illuminating Engineer," published in March, 1906, appeared a short article entitled "Crystal Effects in Fixture Design," from which I quote as follows. "History repeats itself, particularly in matters of art. The glass chandelier, which but a few years ago was being taken down and relegated to the garret or to the junk dealer, has been rediscovered, and restored to the place of honor in the most elegantly decorated dining rooms of new and palatial hotels, and in the dwellings of millionaires. The return to this earlier form of decorative art is to be particularly commended in this instance, for the reason that it was originally a good form of art; and that which is in truth 'a thing of beauty' will in fact be 'a joy for ever.'" This quotation is of interest now because, judging from the number of crystal "fixtures" of Empire period design which are now being marketed, as well as from the reappearance of glass "fixtures" in "Art Nouveau" designs of the Edwardian period, history is again in the process of repeating itself. I confess to more than a sneaking regard for these glittering crystal creations, even though their use may break some of the "rules" for "comfortable" lighting. Whether this regard is because they really are things of beauty or because, for me, they are nostalgic and romantic is no matter. However, I have not yet succumbed to the temptation to acquire one of these attractive fittings but, having relighted my living-room, I have satisfied my rebellious desire for a "crystal effect" as well as my scientific-lighting "better self" by installing a unit of the type illustrated on p. 118 of the April issue of this journal. Incidentally, this gives my room a loftier appearance and affords the ubiquitous spider little scope for hanging his flimsy festoons.